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# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY CASWELL FILE

WASHINGTON, DC 20460

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OFFICE OF PESTICIDES AND TOXIC SUBSTANCES

MAR 23 1990

#### **MEMORANDUM**

SUBJECT: DEET: Review of a two-generation reproduction in rats and a 90-day dose-range finding study in hamsters

Caswell No. 346

HED Project No. 0-0837

MRID No. 413441-01 (90-day Hamster study)

409790-01 (2-generation reproduction in rats)

EPA Record No. 260700

TO:

Donna Williams, PM Team (17)

Special Review and Re-registration Division (H5705C)

FROM:

Whang Phang, Ph.D.

Pharmacologist

HFAS/Tox. Branch II/ HED (H5709C)

THROUGH:

K. Clark Swentzel, Section Head N. Clark thw

Marcia van Gemert, Ph.D. Mwan Council 3/19/90

Branch Chief

HFAS/Tox. Branch II/ HED (H5709C)

Toxicology Branch II has been requested to review a 2-generation reproduction study in rats, a 90-day dose-range finding study in hamsters, a mouse oncogenicity study, and a rat teratology study on Deet by Special Review and Re-registration Division. These studies were listed under the same Data Review Record. The 2-generation reproduction study in rats was previously reviewed and transmitted to P. Hutton/J. Tavano, PM Team 17, on Dec 13, 1989 (Tox. Doc. No. 007645). The results from the 90-day dose-range finding study in hamsters are to be used for selecting the appropriate test animals and dose levels for a chronic feeding study. To facilitate the initiation of the long term study, the 90-day feeding study in hamster has been reviewed first while the mouse oncogenicity and the rat teratology studies will be reviewed in a later date. The data evaluation reports of the two evaluated studies are attached, and the conclusions are as follows:

1). 2-generation reproduction study in rats: The study was evaluated by Dynamac Corp.. The HFAS/Tox. Branch II does not agree with certain scientific judgments made by Dynamac. This reviewer has prepared an addendum reflecting the

scientific opinions of the Branch. The addendum is attached to the data evaluation report of this study.

Groups of rats (28/sex/dose) received DEET at dietary concentrations of 0, 500, 2000, and 5000 ppm for two consecutive generations. Based upon the results presented in the study, the NOEL for parental toxicity could not be established, and the LOEL was 500 ppm which was the lowest tested dose. The 500 ppm males showed signs of kidney effects which included mottling, inflam- presence of hyaline droplets, granular cast formation, and tubular regeneration.

No reproductive or developmental toxicity was found, and the NOEL for reproductive toxicity was 5000 ppm (highest tested dose).

This study satisfies the data requirements for a 2-generation reproduction study (Guideline No. 83-4) and is classifies as core minimum.

2). 90-day dose-range finding study in hamsters: Groups of hamsters (15/sex/dose) received 0, 1,000, 5,000, 10,000, and 15,000 ppm of DEET (technical grade) in the diet for 90 days. Compound-related effects were seen in animals which received 5,000 ppm DEET or above. At 5,000 ppm in males, there was a consistent drop in food consumption and body weight. decrease in body and food consumption was more marked in 10,000 and 15,000 ppm males and females. The increase in the incidence of gross pathologic and histologic changes in testes and epididymides were found in 10,000 and 15,000 ppm The gross pathologic changes were small testes and epididymides, and microscopically these changes were degeneration of the testes and cellular debris in the epididymal tubules. At 15,000 ppm, there were deaths in both males and females. Based upon these observations, the NOEL was 1,000 ppm; LEL, 5,000 ppm.

The results of the study clearly demonstrated that the renal lesion seen in the DEET treated male rats was not found in the hamsters which received DEET up to 15,000 ppm. This study satisfies data requirements for a 90-day feeding study in rodent (Guideline No. 82-1) and is classified as core minimum.

Reviewer:

HFAS/Tox. Branch II (H7509C) 3/16/90

Secondary Reviewer: K. Clark Swentzel, Section Head A. Conk Argument Reach II (H7509C)

DATA EVALUATION REPORT

Study Type:

90-Day feeding study in hamster (Dose-range finding

study)

Chemical:

DEET (N, N-diethyl-m-toluamide)

Caswell No. 346

HED Porj. No. 0-0837

MRID No. 413441-01 EPA Record No. 260700

EPA ID No. CSMA TF

Sponsor: DEET Joint Venture/Chemical Specialties Manufacturers

Association

Testing Facility:

International Research and Development Corp.

500 N. Main

Mattawan, Michigan 49071

Citation:

Goldenthal, E.I. (1989) Evaluation of DEET in a 90day dose-range finding study in hamsters. International Research and Development Corp.; Lab.

Project No. 555-012. Oct. 25, 1989

In this study, groups of hamsters (15/sex/dose) received 0, 1,000, 5,000, 10,000, and 15,000 ppm of DEET (technical grade) in the diet for 90 days. Compound-related effects were seen in animals which received 5,000 ppm DEET or above. At 5,000 ppm in males, there was a consistent drop in food consumption and body weight. The decrease in body and food consumption was more marked in 10,000 and 15,000 ppm males and The increase in the incidence of gross pathologic and histologic changes in testes and epididymides were found in 10,000 and 15,000 ppm males. The gross pathologic changes were small testes and epididymides, and microscopically these changes were degeneration of the testes and cellular debris in the epididymal At 15,000 ppm, there were deaths in both males and tubules. Based upon these observations, the NOEL was 1,000 ppm; females. LEL, 5,000 ppm.

The results of the study clearly demonstrated that the renal lesion seen in the DEET treated male rats was not found in the hamsters which received DEET up to 15,000 ppm. This study satisfies the data requirements for a 90-day feeding study in rodent (Guideline No. 82-1) and is classified as core minimum.

#### Methods and Materials

Test article: Technical DEET (98.3%) was "a mixture consisting of equal parts of four representative production runs" supplied by four manufacturers. The test article was a pale yellow liquid and assigned the ID No. IRDC 8812B at the testing laboratory.

Test animals: Groups of 35 days old Golden Syrian VAF/Plus<sup>(R)</sup> hamsters (96 males and 97 females) were obtained from Charles River Lab., Inc. Montreal, Canada. These hamsters were acclimated to the laboratory conditions for 21 days, during when they were given detailed examinations and were observed daily for signs of abnormality.

#### Study Design

1. Animal assignments: All hamsters were weighed at 10 days and again at 7 days before the initiation of the study. Any hamster whose weight gain during this period or any hamster whose absolute body weight at the second weighing was outside of ±20% of population mean was not included in the test. Seventy-five males (body weight 105-131 gm) and 75 females (body weight 105-131 gm) were selected and randomly assigned to the following treatment groups:

Dosage Levels	Number of A	Animals
<u>mqq</u>	<u> Males</u>	Female
(control) 0	15	15
1,000	15	15
5,000	15	15
10,000	15	15
15,000	15	15

The test hamsters were housed individually.

2. Test article administration: The animals received the test chemical in the diet. Although the main route of human exposure to DEET is by dermal route, there are two reasons for selecting oral administration of DEET: (1) the existing toxicity indicate that oral route exposure is just as toxic as that with dermal exposure and (2) a practical consideration.

The test diet was prepared by first preparing a premix for each concentration with a portion of the required amount of ground diet. The premix was then blended with the additional required amount of the diet to yield the intended concentrations of 1,000, 5,000, 10,000, and 15,000 ppm of the test article. The test diet

was prepared weekly. Samples were taken and tested for homogeneity and stability. The test chemical concentration in the diet was determined with samples taken on weeks 2 through 4, 8 and 12. The prepared test diets were stored at room temperature in stainless steel containers.

- 3. Observations: The test animals were observed for any clinical signs of toxicity twice daily. External physical examination which included gentle palpation of internal organs and assessment for abnormal behavior were conducted weekly.
- 4. Body weight and food consumption: Individual body weight measurements were determined at pretest and weekly during the study. Individual food and compound consumptions were also determined weekly throughout the study period.
- 5. Hematology and biochemical analyses: At the 13th week of the study, blood samples were collected from 10 hamsters/sex/dose. These animals were fasted overnight (for approximately 16 hrs) prior to sample collection.

Hematology: The following hematological parameters were
 measured:

erythrocyte count
leukocyte count
hematocrit
reticulocyte count
Mean corpuscular
hemoglobin (MCH)

hemoglobin
differential leukocyte count
platelet
Mean corpuscular volume (MCV)
Mean corpuscular hemoglobin
concentration (MCHC)

<u>Clinical chemistry</u>: The following biochemistry parameters were determined:

sodium
chloride
phosphorus
aspartate aminotransferase (AST) (SGOT)
urea nitrogen
total protein
globulin

potassium
calcium
total bilirubin
alanine aminotransferase
(ALT) (SGPT)
creatinine
albumin
glucose

- 6. <u>Pathology</u>: At the end of 13 weeks, all animals were weighed and sacrificed.
  - a. <u>Necropsy</u>: A thorough external examination was conducted on each animal. The contents of the abdominal, thoracic, and cranial cavities were examined.

b. Organ weights: The following organs were removed, trimmed free of fat, and weighed:

adrenals liver brain ovaries kidneys testis

c. <u>Histopathology examination</u>: A full complement of organs and tissues of 10 hamsters/sex were processed and microscopically examined. The animals were randomly selected from the controls and the high dosage groups. In Addition, epididymides of all males in all dose groups, and liver, kidney, and testis from 1000, 5000, and 10000 ppm groups were examined. Mallory-Heidenhain stain (for hyaline droplets) was also applied for microscopic examination for kidneys from 10 selected animals in each dose group.

A full complement of organs and tissues consisted of the following:

adrenals lung with mainstem and bone marrow bronchi brain lymph nodes (mediastinal ovary and mesenteric) testis with epididymis pancreas heart pituitary spinal cord (entire) spleen kidneys thymic region liver thyroid/parathyroid

7. Statistics: Analysis of variance (one way classification) and bartlett's test were use to analyze values of the body weights, food consumption, hematology, clinical chemistry, and absolute and relative organ weights.

T-Statistic (for equal or unequal variance) as described by Torrie and Ostle was used to compared the values of the treatment to those of the controls. The significance of difference was determined using Dunnett's multiple comparison tables.

All statistical tests were two-tails, and the level of significance was set at p<0.05 and p<0.01.

8. Quality assurance: A quality assurance statement was signed and included in the report.

#### Results

- 1. <u>Clinical observation</u>: Clinical signs such as labored breathing, decreased defecation, decreased activity, and pale skin were reported to be seen frequently in the 15,000 ppm animals which died during the test. Other findings were comparable between treated and control animals.
- 2. <u>Survival rates</u>: The survival rates were comparable among the animals in 10,000 ppm or less groups and controls. There were 3 and 4 deaths in 15,000 ppm males and females, respectively (Table 1).

Table 1\*
Survival Rates of DEET Treated Hamsters at 13 Weeks

Dose Level (ppm)	Males	Females
(control) 0	15/15	15/15
1,000	15/15	15/15
5,000	14/15	15/15
10,000	15/15	15/15
15,000	12/15	11/15

- \* Table excerpted from the report (IRDC No. 555-012; page 24).
- 3. Body weights: The mean body weight values were excerpted from the report and presented in Table 2. The results showed that for males which received 5,000 ppm DEET or more, there was a consistent decrease in body weight relative to the controls throughout the entire test period. The decrease was statistically significant for 15,000 ppm males during the during of treatment (Table 2). At 13 week the decrease in 5,000, 10,000, and 15,000 ppm males was greater than 10% of the controls.

For females, the animals at 10,000 ppm and 15,000 ppm showed statistically significant drop in body weight during the study (Table 2).

- 4. Food consumption: The food consumption data indicated that there was a decrease in food intake in males which received 5,000 ppm or more and in females at 10,000 and 15,000 ppm (Table 3). The decrease in food intake in 15,000 ppm males and females was greater than 10%.
- 5. Test diet analysis: The samples throughout the study showed the prepared test diets "at levels of 1,000, 5,000, 10,000, and 15,000 ppm contained 99, 100, 98, and 99% of of the respective target concentrations". The compound in the diet was found to be stable for at least 10 days at room temperature.

6. Compound intake: The average compound intake during 13 week of the study was presented below:

Concentrations in	<u>Average compound</u>	<pre>intake(mg/kg/day)</pre>
the diet (ppm)	<u> Male</u>	Females
(control) 0	0	0
1,000	61	61
5,000	304	305
10,000	611	636
15,000	940	939

- 7. <u>Hematology</u>: There sporadic changes in certain parameters, but these changes were not consistent and did not show any dose-relationship. Therefore, there were no treatment related changes in all parameters examined.
- 8. Clinical chemistry: In 15,000 ppm males and females, there was a statistically significant increase in potassium level. Additional compound related changes were not seen. The values for potassium were excerpted from the report and presented below:

	Potas	sium (mEq/L)
Dose level (ppm)	Males	Females
(Control) 0	$6.7 \pm 0.46$	7.0 <u>+</u> 0.55
1,000	7.3 <u>+</u> 0.86	$7.2 \pm 0.63$
5,000	$7.1 \pm 0.78$	$6.9 \pm 0.44$
10,000	$7.3 \pm 0.46$	$7.0 \pm 0.20$
15,000	$7.8 \pm 0.60*$	$/7.7 \pm 0.56*$

<sup>\*</sup> Significantly different from control; p<0.05

### 9. Pathology

- a. <u>Macroscopic</u>: Small testes and epididymides were seen in both the controls and the treated animals, but the incidence was increased in 10,000 and 15,000 ppm males (Table 4). These findings were compound-related. Other macroscopic findings were not compound-related (Table 4).
- b. Organ weights: The relevant organ weights were excerpted from the report and presented below:

Summa	ary of Selective Ord	gan Weights
pm	<u>testis (q)</u>	testis/brain (%)
(Control) 0	$2.08 \pm 0.966$	$185.30 \pm 88.252$
1,000	$2.12 \pm 0.906$	$190.88 \pm 85.083$
5,000	$2.22 \pm 0.983$	$201.69 \pm 89.406$
10,000	$1.23 \pm 0.783*$	$110.59 \pm 71.265$
15,000	1.17 + 0.859*	108.89 + 83.047

\* Significantly different from the controls; p<0.05

The absolute testis weight of 10,000 and 15,000 ppm males was significantly decreased (p<0.05) from that of the controls. This finding was consistent with the gross pathology observation for small testes. In addition, the ratios of testis weight/brain weight and testes/body weight were decreased for these two treatment groups relative to that of the controls. There were also increases in the ratios of liver/body weight and kidney weight/body weight, but these increases were secondary to the decreases in the body weights of these animals. Other organ weights were comparable to those of the controls.

d. Histopathology: Increased incidence of tubular degeneration in the testes and of accumulation of cellular lumenal debris in the epididymides of 10,000 and 15,000 ppm males were found. Although these observations were also found in the control males, but the degree of injury in these two high-dose groups was more severe (Table 5). The effects seen in testes and epididymides were consistent with the macroscopic findings, and they were compound related. The report described the testicular tubular degeneration as characterized by the presence of degenerating tubular epithelial cells within the seminiferous tubules of the testes. This lesion was bilateral and ranged from trace to moderate in severity. The hamsters with testicular degeneration also had small epididymides with macroscopic examina-This reviewer agreed with the study author that epididymal finding was secondary to the testicular alteration. Other histologic findings were also seen, but these findings were infrequent and did not show any dose-related effects. They were not considered to be compound-related effects.

#### Discussion

There were two objectives in conducting this 90-day feeding study in hamsters. The primary goal was to determine if a kidney lesion which characterized by hyaline droplets formation in the renal tubules of male rats treated with DEET for 90 day would occur in male or female hamsters. If the kidney lesion was not seen in the DEET treated hamsters, the other objective was to obtain results which could be used for selecting doses for a chronic feeding study on hamsters.

In this study, groups of hamsters (15/sex/dose) received 0, 1,000, 5,000, 10,000, and 15,000 ppm of DEET (technical grade) in the diet for 90 days. Compound-related effects were seen in animals which received 5,000 ppm DEET or above. At

5,000 ppm males, there was a consistent drop in food consumption and body weight. The decrease in body and food consumption was more marked in 10,000 and 15,000 ppm males and females. The increase in the incidence of gross pathologic and histologic changes in testes and epididymides were found in 10,000 and 15,000 ppm males. The gross pathologic changes were small testes and epididymides, and microscopically these changes were degeneration of the testes and cellular debris in the epididymal tubules. At 15,000 ppm, there were deaths in both males and females. Based upon these observations, the NOEL was 1,000 ppm; LEL, 5,000 ppm.

The results of the study clearly demonstrated that the renal lesion seen in the DEET treated male rats was not found in the hamsters which received DEET up to 15,000 ppm. This study study satisfies the data requirements for a 90-day feeding study in rodent (Guideline No.: 82-1) and is classified as core minimum.

	WEEK	-				-1	Body Weigh	· values		<del></del>		<del></del>	
_	OF	OP	PM (CONTROL					1,000 PPH				000	
Parameters Measured	STUDY	HEAN	S.D.	M			MEAN	S.D.	K	.—	MEAN	,000 PPN S.D.	
Dad. Ustaka	44.100										716141	3.0.	#
Body Weight	ALLOC	119	7.8	15	_		.117	7.6	.15		118	7.9	••
grams	1	123	6.9	15	-		120	8.7	15		1122	7.9	15
	2	128	6.3	15			126	9.9	15		119 <sup>2</sup>		15
	.3	129	7.7	15			128	9.5	15		122	9.4	15
	4	140	9.5	15			136	11.8	15		133	9.9	15
	5	148	10.0	15			142	12.3	15		138	11.9	15
	,6	150	11.4	15			140	13.5	15		142	13.0	15
	,	156	12.3	15			152	13.2	15			13.3	15
	8	161	13.1	15			158	13.8	15		147	14.9	15
	9	165	12.8	15			165	14.9	15		151	16.6	15
	10	172	14.1	15			169	14.8	15		155	19.0	14
	11	175	12.8	15			174	15.1	15		159	20.2	14
	12	178	14.1	15			176	15.7			162	22.2	14
	13	174	14.9	15			171		15		161	24.3	14
							471	15.2	15		156	26.4	14
	WEEK						<del></del>		· · · · · · · · · · · · · · · · · · ·	<del></del>	<del></del>		
	OF			10	,000 PPH					15 000 000			
arameters Measured	STUDY		HE		S.O.	-			MEAN	15,000 PPH			
								<del></del>	HEAR	<u>s.o.</u>	<u> </u>		
ody Weight	AL1.0C		11	17	8.1	15			119				
rams	1			14 <sup>2</sup>	9.2	15			89 <sup>2</sup>	8.0	15		
	2			42					93.	10.3	15		

		- PEAR	5.0.		MEAN	S.D.	#
Body Weight	AL1.0C						
· · · · · · · · · · · · · · · · · · ·	ACT.UC	117	8.1	15	119	8.0	15
rams	1	104 <sup>2</sup>	9.2	15	89 <sup>2</sup>	10.3	
	2	114 <sup>2</sup>	7.7	15			15
	3				88 <sup>2</sup>	21.3	15
	7	120 <sup>1</sup>	7.8	15	103 <sup>2</sup>	13.7	.12
	•	131	17.8	15	120 <sup>2</sup>	12.4	12
	.5	139	15.0	15	128 <sup>2</sup>		
	6	143				10.8	12
	7		18.4	15	133 <sup>1</sup>	11.9	12
	<u>.</u>	146	20.1	15	135 <sup>2</sup>	13.3	12
	8	152	16.2	15	137 <sup>2</sup>	15.2	12
	.9	157	17.2	15			
	10				1422	15.7	12
		159	16.6	15	141 <sup>2</sup>	20.9	12
	.11	162	16.2	15	145 <sup>2</sup>	19.6	12
	12	159 <sup>1</sup>	15.3	15	151 <sup>2</sup>		
	.13	152 <sup>1</sup>					12
		.130	16.8	15	143 <sup>2</sup>	23.3	12
5-012			<del></del>	<del></del>			

	WEEK	<del>, , , , , , , , , , , , , , , , , , , </del>		Females: 5	summery of Body Weigi	nt Values*					
	0F		PH (CONTROL	)		1,000 PPN					
Parameters Measured	STUDY	HEAN	S.D.	H	HEAH	\$.0.	N		HEAN	5,000 PPM S.D.	
lody Weight	ALLOC	120	9.9	15	118			· · · · · · · · · · · · · · · · · · ·		3.0.	
rams	1	131	9.6	15	126	9.9 12.4	15 15		120 121	9.8 15.9	15 15
	3	139 144	10.5 12.2	15 15	137 143	11.9	15		132	14.3	15
	4	153	13.2	15	154	12.1 12.2	15 15		141 151	10.0 12.4	15 15
	6	162 169	14.1 13.8	15 15	161 167	13.8 15.9	15 15		157	13.0	15
	7 8	173 179	14.8	15	170	16.5	15		165 1 <del>69</del>	9.6 10.0	15 15
	9	183	13.6 12.8	15 15	173 180	15.8 17.4	15 15		173	10.9	15
	10 11	183 185	17.7 20.3	15 15	184	16.2	15		179 183	12.6 13.0	.15 15
	12	191	18.0	15	186 189	16.0 16.8	15 15		185	13.5	15
	13	186	12.7	15	162	15.6	15		186 180	15.7 18.0	15 15
	WEEK	<del></del>									

	WEEK					·	
arameters Measured	OF STUDY		,000 PPH		15	,000 PPH	
	3,007	HEAN	S.D.	N	HEAH	5.0.	<u> </u>
ody Weight rams	ALLOC 1 2 3 4 5 6 7 8 9 10 11	115 109 <sup>2</sup> 122 <sup>2</sup> 127 <sup>2</sup> 142 149 <sup>1</sup> 151 <sup>2</sup> 154 <sup>2</sup> 157 <sup>2</sup> 163 <sup>1</sup> 168 <sup>1</sup> 171	9.5 10.7 9.7 9.9 13.9 14.5 14.7 20.6 26.0 27.6 21.9 19.2	15 15 15 15 15 15 15 15 15 15 15 15	123 93 <sup>2</sup> 104 <sup>2</sup> 120 <sup>2</sup> 138 <sup>1</sup> 146 <sup>1</sup> 152 <sup>2</sup> 155 <sup>1</sup> 166 <sup>2</sup> 166 <sup>1</sup>	8.9 13.8 21.0 15.5 10.9 10.2 12.0 12.6 12.7 9.3 9.0 10.4	15 15 15 12 11 11 11 11 11 11 11
5-012	13	168 <sup>2</sup>	17.7	14	170 <sup>2</sup> 158 <sup>2</sup>		.8 .3

<sup>. . .</sup> 

S.D. - Standard Deviation

N - Number of Animals

1 Significantly different from the Control group: p<0.05

 $<sup>^2</sup>$ Significantly different from the Control group; p<0.01

N - Number of Animals ALLOC - Allocation

## TABLE 3\*

	WEEK	-			,			ption Value	•							
Parameters Heasu	OF Iced STUDY		PPH (CONTROL			•		1,000 PP								
	1160 31001	MEAN	S.D.	<u> </u>			HEAN	5.0.				-	HEAN	5,000	D.	
Fund Consumption	1	9.8	1.21	12									******	<u>,</u>	υ	
g/animal/day	.2	8.2	0.71	15			9.2	1.0					7.3	١ ,	.06	1
	3	8.7	0.74	15			8.1	0.8					7.9		.27	i
	4	10.2	1.29	15			9.3 <sup>1</sup>	0.9					9.8	,	.67	1
	5	9.8	0.89	15			9.6 9.3	1.3					9.8		.20	1
	6	8.5	1.15	15			9.0	1.0					9.2	1	.08	1
	7	9.5	0.95	15			8.9	0.8					8.5	.0	.87	1
	8	9.3	0.83	15			9.1	0.7 1.1			• .	•	8.9	ŧ	.16	ı
	9	9.2	0.77	15			9.4	0.7					8.5	1	.44	1
	10	9.6	1.20	15			9.4	0.9					8.8	1	.74	1
	.11	9.4	1.31	15			9.5	1.0					8.8		. St	1
	12	9.3	1.44	15			8.8	1.24					9.1	1	.92	1
	.13	7.6	1.50	15			7.5	1.00					8.1	3	. 78	1
	WEEK								1.4				6.9	1	.69	12
	OF .							-	-				<del></del>			
Parameters Heasure					OO PPH						15,000 P	•••				
- di discreta incasuri	eg 21004	<del></del>	NE	AM	S.D.	K				HEAN	13,000 F			<del></del>		
Food Consumption	1											٠,	H	*	<del></del>	<del></del>
3/animal/day	2			.0 <sup>2</sup>	3.14	14				4.42	•	. 17	11			
, ouy	3			.0 <sup>L</sup>	0.94	13				5.6		. 69	10			
	4			.8 <sup>2</sup>	1.10	15				9.2		.15	12			
	5		10.		2.37	15				10.4		. 45	12			
	6		9.		1.39	15				9.4		.33	12			
	7		.8.		1.40	15				8.9		45	12			
	8		8.		1.12	15				8.12		11	11			
	9		8.		0.58	15				8.31	1.		12			
	10		9.		1.19	14				8.3	2.		12			
	ü		8		1.54	15				8.0 <sup>1</sup>	1.4		9			
	12		8.9	_	1.33	15				8.0	2.		12			
	13		7.0		1.06	16			•	8.9	1.1		12			
	••		6.6	•	1.15	12										
55-012						**				6.9	1.1	64	17			
33-012		· · · · · · · · · · · · · · · · · · ·	<del></del>				·			6.9	1.0	54	12			
33-012		•	<del>*************************************</del>		<del></del>		<del></del>				1.6	54	12	<del></del>		
	WFFK	•	fe	males: Su	<del></del>		Consumpt	ion Values			1.(	54 	12	····	<del></del>	
	WEEK OF			males: Su	<del></del>		Consumpt	ion Values			1.0	54	12			
	OF	O PPH	(CONTROL)	<u></u>	<del></del>	r Food	1	,000 PPH			1.0	₩ 	12	5 000 equ		
erameters Measured	OF		(CONTROL)	males: Su	<del></del>	r Food				•.•	1.6			5,000 PPH		
rameters Measured	OF STUDY	O PPH	(CONTROL) S.O.	<u> </u>	<del></del>	r Food	HEAN 1	,000 PFH 5,0,			1.4	INE		5,000 PPH S.D.		
rameters Measured	OF STUDY	O PPH MEAN	(COMTROL) S.O. 1.62 19	<u>N</u>	<del></del>	r Feed	HEAN 1	,000 PPH 5,0,	14	-		ME		S.D.		
rameters Measured	OF STUDY	O PPH MEAM II.3	(CONTROL) S.O. 1.62 1: 1.12 1:	<u>N</u> 5	<del></del>	F Fgod	10.3 10.0	,000 PPM \$,0, 1.65 1.48	14 13	-		HE.	.2 <sup>1</sup>	\$.D. 4.59	1	z
aremeters Measured	OF STUDY	0 PPH MEAN 11.3 9.8	1.62 1: 1.12 1: 1.07 1-	N 5 5	<del></del>	F Fgod	10.3 10.0 12.1 <sup>2</sup>	1.65 1.48 1.16	14 13 15	-		HE.	AH .2 <sup>1</sup> .5	\$.D. 4.59 2.54	1	2 4
remeters Measured	OF STUDY	0 PPM MEAN 11.3 9.8 10.6	1.62 1: 1.12 1: 1.07 14	<u>N</u> 5 5 6	<del></del>	F Fand	10.3 10.0 12.1 <sup>2</sup>	1.65 1.48 1.16 1.24	14 13	•		8. 8. 12.	AH .21 .5 .22	\$.D. 4.55 2.54 0.91	1 1	2 4 5
remeters Measured	OF STUDY	0 PPH MEAN 11.3 9.8 10.6 11.1	1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1:	N5 5 6 6	<del></del>	F Fand	10.3 10.0 12.1 <sup>2</sup> 11.5 0.9	1.65 1.48 1.16 1.24 1.21	14 13 15	• • • • • • • • • • • • • • • • • • • •		8. 12.	.2 <sup>1</sup> .5 .2 <sup>2</sup>	\$.D. 4.59 2.54 0.91 2.91	) 1 1 1:	2 4 5
remeters Measured	0F STUDY 1 2 3 4 5 6 7	0 PPH 11.3 9.8 10.6 11.1 10.7	1.62 1: 1.07 14 1.19 15 0.68 15	N 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	<del></del>	Feed	NEAN 10.3 10.0 12.1 <sup>2</sup> 11.5 10.9	1.65 1.48 1.16 1.24 1.21	14 13 15 15 15 15	• • • • • • • • • • • • • • • • • • • •		8. 8. 12.	All .2 <sup>1</sup> .5 .2 <sup>2</sup> .1	\$.0. 4.55 2.54 0.91 2.91 2.20	1 1: 1: 1: 1:	2 4 5 5
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arameters Measured and Consumption Animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL) S.O.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.92 1: 0.93 1: 2.29 1: 0.94 1: 0.94 1:	N 55 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ery o	Facel	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15	-		8. 8. 12. 11. 10. 10. 10. 10. 10.	21 5 22 1 1 3 9 0 0 1 1 1 3 3 5	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64 1.22	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
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irometers Measured animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13 WEEK OF STUDY	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(COMTROL) S.D.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.94 1: 0.93 1: 2.29 1: 2.00 1: 0.94 1: 2.57 14	10,000	PPN .0.	F Feed	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15	1! EAM 3.0 <sup>2</sup>	5,000 PPM S.D.	8. 8. 12. 10. 10. 10. 10. 8.6	AM 24 5 5 22 1 1 3 3 9 9 0 1 1 1 3 3 5 0 0	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
irometers Measured animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13  WEEK OF STUDY	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(COMTROL) S.O.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.94 1: 0.92 1: 0.93 1: 2.29 1: 0.94 1: 2.57 14  HEAM  7.5² 10.0 11.3	10,000 S	PPN .0.	# # # # # # # # # # # # # # # # # # #	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	11 EAN 1.0 <sup>2</sup> 7.4 <sup>1</sup>	5,000 PPH 5.0.	8.8.12.11.10.10.10.10.10.10.10.10.10.10.10.10.	AM 21 5.5 7.2 1 1 3 3 9 0 0 1 1 1 3 3 5 0 0 M	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
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irometers Measured animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13  WEEK OF STUDY	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL) S.O.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.94 1: 0.93 1: 2.29 1: 2.00 1: 2.57 14  HEAM  7.5² 10.0 11.3 10.9 10.5	10,000	PPW .02.97 1.52 1 1.70 1 1.09 1	# 8 5 5 5 5 5 5	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	19 EAN 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4 1.4	5,000 PPM 5.0. 2.63 2.64 1.52	8.8.12.11.10.10.10.10.10.10.10.11.11.11.11.11.	21 22 22 21 1 1 3 9 9 0 0 1 1 1 9 9 0 0 1 1 1	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
erometers Measured and Consumption animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13  WEEK OF STUDY	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL) S.D.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.94 1: 2.29 1: 2.00 1: 0.94 1: 2.57 1:4  MEAN  7.5² 10.0 11.3 10.9 10.5 9.1¹	10,000 S	PPN .0. 2.97 1.52 1 3.92 1 1.70 1 1.70 1	# # # # # # # # # # # # # # # # # # #	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	115EAN 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4	5,000 PPM 5.0. 2.63 1.52 1.26	8. 8. 12. 11. 10. 10. 10. 10. 10. 10. 11. 11. 11	AM	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
erometers Measured and Consumption animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13  WEEK OF STUDY  1 2 3 4 5 6 7 8	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(COMTROL) S.O.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.92 1: 0.93 1: 2.29 1: 0.94 1: 2.57 1:  HEAM  **T.S²** 10.0 11.3 10.9 10.5 9.11	10,000 S	PPN .0. 2.97 1.52 1 0.92 1 1.70 1 1.38 1 1.554 1	# # # # # # # # # # # # # # # # # # #	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	15 EAM 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4 2.0 1.5 <sup>1</sup> 1.4 <sup>1</sup>	5,000 PPM S.D. 2.63 2.64 1.52 1.26	8. 8. 12. 11. 10. 10. 10. 10. 10. 10. 11. 11. 11	AM	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
irometers Measured animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13 WEEK OF STUDY  1 2 3 4 5 6 7	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL) S.O.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.92 1: 0.93 1: 2.29 1: 0.94 1: 0.94 1: 2.57 14  HEAN  7.5 <sup>2</sup> 10.0 11.3 10.9 10.5 9.1 <sup>1</sup>	10,000 S	PPN .0. 2.97 1.52 1 1.70 1 1.09 1 1.38 1 1.54 1 1.52 1 1.20 1	N 8 8 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	1: EAN 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4 2.0 1.3 1.4 <sup>1</sup> 1.6 <sup>2</sup>	5,000 PPM 5.0. 2.63 2.64 1.52 1.14 0.71	8. 8. 12. 11. 10. 10. 10. 10. 10. 10. 11. 11. 11	21 22 22 11 13 39 00 11 13 38 90 11 11 11	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
erometers Measured and Consumption animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13  WEEK OF STUDY  1 2 3 4 5 6 7 8 9 10	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL) S.O.  1.62 1: 1.12 1: 1.07 1: 1.47 1: 1.19 1: 0.68 1: 0.92 1: 0.93 1: 2.29 1: 2.00 1: 2.57 14  MEAN  ***********************************	10,000 S	PPH .02.97 1.52 1 1.70 1 1.38 1 1.20 1 1.	# # # # # # # # # # # # # # # # # # #	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 11 11	1: EAM 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4 2.0 1.3 1.5 <sup>1</sup> 1.6 <sup>2</sup>	5,000 PPH S.O. 2.63 1.52 1.26 1.14 0.71	8. 8. 12. 10. 10. 10. 10. 10. 10. 11. 11. 11. 11	21 22 22 21 1 1 3 3 5 5 5 5 5 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
arameters Measured cod Consumption /animal/day rameters Measured and Consumption nimal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13 WEEK OF STUDY  1 2 3 4 5 6 7 8 9 10 11 11 12 13	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL)	10,000 S	PPN .0. 2.97 1.52 1 1.70 1 1.38 1 1.54 12 1.20 12 1.88 1 1.07 12	# # # # # # # # # # # # # # # # # # #	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	15 EAN 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4 2.3 1.5 <sup>1</sup> 1.4 <sup>2</sup> 1.6 <sup>2</sup> 1.2	5,000 PPM 5.0. 2.63 1.52 1.26 1.14 0.71 0.60 1.26	8. 8. 12. 10. 10. 10. 10. 10. 10. 11. 11. 11. 11	21 55 55 11 13 99 00 11 11 11 11	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
erometers Measured and Consumption animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13  WEEK OF STUDY  1 2 3 4 5 6 7 8 9 10	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL)	10,000 S	PPN .0. 2.97 1.52 1 3.92 1 1.70 1 1.38 1 1.38 1 2.54 1 2.54 1 2.68 1 3.07 1 3.44 15	# # # # # # # # # # # # # # # # # # #	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	15 EAN 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4 2.0 1.5 1.3 1.5 1.6 <sup>2</sup> .2 .4	5,000 PPM S.D. 2.63 2.64 1.52 1.14 0.71 0.60 1.26	8.8.8.12.11.10.10.10.10.10.11.11.11.11.11.11.11.	AM	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
irometers Measured animal/day	OF STUDY  1 2 3 4 5 6 7 8 9 10 11 12 13 WEEK OF STUDY  1 2 3 4 5 6 7 8 9 10 11 11 12 13	0 PPM NEAM  11.3 9.8 10.6 11.1 10.7 10.2 10.2 10.1 9.9 9.3 10.3	(CONTROL)	10,000 S	PPN .0. 2.97 1.52 1 1.70 1 1.38 1 1.54 12 1.20 12 1.88 1 1.07 12	W 8 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	10.3 10.0 22.1 <sup>2</sup> 11.5 0.9 9.6 9.3 9.0 <sup>2</sup> 9.5 9.7	1.65 1.48 1.16 1.24 1.23 1.61 0.87 1.59 1.22 1.22	14 13 15 15 15 15 15 15 15 15 15 15 15 15 15	15 EAN 3.0 <sup>2</sup> 7.4 <sup>1</sup> 1.4 2.3 1.5 <sup>1</sup> 1.4 <sup>2</sup> 1.6 <sup>2</sup> 1.2	5,000 PPM S.D. 2.63 2.64 1.52 1.14 0.71 0.60 1.15 0.68	8. 8. 12. 11. 10. 10. 10. 10. 10. 10. 11. 11. 11	21 22 22 1 1 1 3 3 9 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	\$.D. 4.56 2.56 0.91 2.91 2.20 1.27 1.35 1.13 1.64 1.22	1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5

S.O. - Standard Deviation N - Number of Animals

<sup>\*</sup>Significantly different from the Control group; p<0.05

<sup>&</sup>lt;sup>2</sup>Significantly different from the Control group; p<0.01

<sup>\*</sup> TABLE EXCERPTED FROM THE REPORT (IRDC No. 555-012)

TABLE H\*

INCIDENCE OF MACROSCOPIC OBSERVATIONS
Deaths and Unscheduled Sacrifices, 0 to Termination
Terminal Sacrifice,

	i er mindi. Sacri i ice,	acritice,				
	SITE	0 ppm (Control)	1.000 ppm	5.000 ppm	10_000 ppm	15,000 ppm
	- Observation	21 500	DOS 15	S1 S00	S1 S00	N 500
	NUMBER OF ANIMALS EXAMINED	0 15	0 15		0 15	3 12
	NUMBER WITHIN NORWAL LIMITS	0 =	0 11	-=	0 8	2 6
Meles	EPIDIDYMIS - Small, mild	•	•	Ų	7	y.
	- Teeth missing, no grade	,		-		
	PENIS - Thick, mild					-
	SPLEEN - Enlarged, moderate			_		
	STOMACH, GLANDULAR - Foci, black, mild					-
	TESTIS - Small, mild	•		u	7	ø
Females	los					
	NUMBER OF ANIMALS EXAMINED	0 15	0 15	0 15	0 - 15	<b>.</b>
	NIMBER WITHIN NORMAL LIMITS	0 15	0 14	0 15	0 15	
	ORAL TISSUES - Teeth missing, no grade		_			
	STOMACH, GLANDULAR  - Eroslon, mild  - Focl, dark red, mild					- N
	•					

555-012

DOS - Deaths and unscheduled sacrifices
TS - Terminal sacrifice

\* DATA EXCERPTED FROM THE REPORT (555-012)

TABLE 5 \*

Selective Incidence of Microscopic Findings

DAyso to remination: Hamstes

MALES

T199118	MALES	3										
OBSERVATION		c pp	Ď	1,000 ppm	PP	5.000 ppm	ppm	10,000 ppm	ppm	15,000 ppm	ppm	
	- Б	800	SAC	DOS	SAC	200	SAC	200	SAC	DOS	SAC	
Kidney Dilatation, tubular,	7	7	<u>.</u>	7	-69	- 1	20	∍ <u></u>	, j	<b>&gt;</b> 9	(0)	
Mineral (Kation, -mild			/ 500	000	oo-	000	00 N	000	- N O	000	000	
-mind	•		زه د	000	900		000	000	- 0 -	000	K	
Within normal limits Regeneration,		000	050	000	<b></b> \$0 €		N Ø C	000	v	000	<b>-</b>	
-trace		00	00	00	o		0 10 1	000	NON	000	000	
Epididymis Lumenal debris, cellular, -tri		000	-==	e e <u> </u>	3	000	ဝမမ်	008	073	999	e	
within normal limits -moder		000	<b>80</b> 00	000	000	000	0 - N	000	0-0	000	சுற்க	
Testis Degeneration trace	•	000	- <b>-</b> 65	999	N 0 0	o-3	(ii	006	۵2 E	ဝမမြ	(12) 0	
Within normal limits		000	<b>-</b> -8	000	500	0-0	ø <u>−</u> ੌ N	000	现在公	000	¥ N O	
555-012 CODE: () = NUMBER OF ANIMALS EX	EXAMINED											
DOS = DIED ONSTADY  SAC = TERMINATION SACRIFICE	nceifice	ų.				\ \ \ \			1	<u>\$</u>	م	
*: DATA EXCERPTED FROM THE REVORT (LRYC	ED F81	3	7756	KER	8	7		(	2	. (		
(Pages 96, 97, 498).	7, 498	ب										